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CHEMICAL ANALYSIS OF ORE TAILINGS REFERENCE MATERIALS

FINAL REPORT

BY

BONDAR-CLEGG & COMPANY

Work on this project was conducted under the auspices of the Department of Energy, Mines and Resources

DSS FILE NUMBER: 09SQ.23440-7-9166-03

DSS CONTRACT NUMBER: 23440-7-9166/03-SQ

SCIENTIFIC AUTHORITY: Dr. C.W. Smith

13pp

MICROMEDIA

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Mr. T. Ferguson
Science Procurement Officer
Dept. of Supply and Services
Science Branch
Phase III, 11C1
Place du Portage
Hull, Quebec
K1A 0S5

April 13 1988

RE: Chemical Analysis of Ore Tailings Reference Materials

Dear Sir:

These procedures are attached to our report V88-00043.4.

METHODS USED TO ANALYSE THE SAMPLES:

Atomic Absorption:

For Cu, Pb, Zn, Cd, Co, Ni, Ca, Al, and Mg

a) 1 gram of the sample was weighed into a beaker.
b) HCl HNO3, HCLO4, and HF were added and the samples were taken down to heavy Perchloric fumes.
c) They were then bulked up in 10% HCl to 100 mls. and boiled into solution.
d) They were then analysed by A.A. using synthetic standards and certified standard pulps.

Total Sulfur:

This analysis was done by Leco Induction Furnace. This is not the preferred procedure for the higher samples however time limits restricted us to the Leco. They were finished by manual titration with KI solution and using pulp standards to standardize the titration solution.

The weights used were as follows;

a) Sample RTS-1 A - F_____0.20 grams.
b) Sample RTS-2 A - F_____0.02 grams.
c) Sample RTS-3 A - F_____0.05 grams.
d) Sample RTS-4 A - F_____0.02 grams.

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Sulfate Sulfur :

1. A 1 gram sample was leached with 10% HClO4 solution and boiled for 1/2 hour.
2. The sample was then cooled and filtered.
3. The filtrate was brought to a boil and 10% BaCl2 was added to precipitate the sulfur as BaSO4.
4. The paper and precipitate was ignited and heated to 950C and the residue weighed.
5. The sulfate sulfur was then calculated.

Carbon Dioxide:

This procedure used the Leco Carbon gas measuring apparatus.

1. 1 gram of the sample was weighed into a test tube.
2. 1::1 HCl solution was then added to the test tube.
3. The Carbon dioxide gas which bubbled off was measured.
4. A calculation was then made to give the amount of CO2 in the sample. Atmospheric pressure was measured at the same time and this was taken into account in the final result.

Silica :

1. Weighed 1.0 grams into a nickel crucible.
2. Added sodium peroxide and stirred.
3. Fused the mixture, cooled, added H2O, perchloric acid and heated the sample until everything was in solution.
4. The samples were evaporated to heavy perchloric fumes.
5. HCl and H2O were added and the samples heated to get the salts into solution. Then the samples were filtered.
6. The filter paper was then ignited and taken to 900 - 1000 C.
7. The ash was weighed and HF added to drive off the silica and then weighed again. The difference was determined to be the silica.

Moisture :

A 1 gram sample was weighed and then placed in a 105C oven for 2 hours, cooled, then weighed again. The difference equals the percent moisture in the sample.

Arsenic :

a) A 0.10 gram sample was weighed into a test tube.
b) HClO4 and HNO3 was then added and the samples were taken down to, almost dryness.
c) Samples were cooled then conc. HCl and water were added.
d) 1 ml of 15% K solution was added. After 15 min. SnCl2 was added to clear the solution.
e) Zn metal was added, the resultant gas was bubbled into a tube containing pyridine and the colour was then read against synthetic standards.

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The preceding methods were used on the tailings samples. Each bottle was weighed 5 times, at the same time, and 5 results were then reported. There are some results missing and due to time constraints and lack of sample material they couldn't be run again. We hope the results will be of help in the certification of the samples.

Sincerely yours

R.K. Rogers
Chief Assayer

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Certificate of Analysis

ENERGY MINES AND RESOURCES CANADA
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Certificate of Analysis

REPORT: V88-00043.4 (COMPLETE)

REFERENCE INFO: REF. 823440-7-9166-3

CLIENT: ENERGY MINES AND RESOURCES CANADA

SUBMITTED BY: C. W. SMITH

PROJECT: NONE GIVEN

DATE PRINTED: 14-APR-88

ORDER	ELEMENT		NUMBER OF ANALYSES	LOWER DETECTION LIMIT	EXTRACTION	METHOD
1	Cu	Copper	120	1 PPM		Atomic Absorption
2	Pb	Lead	120	2 PPM		Atomic Absorption
3	Zn	Zinc	119	1 PPM		Atomic Absorption
4	Cd	Cadmium	120	1 PPM		
5	Co	Cobalt	120	1 PPM		
6	Ni	Nickel	119	1 PPM		
7	Al	Aluminum	119	0.10 PCT		
8	As	Arsenic	120	1 PPM		Colourimetric
9	Ca	Calcium	119	0.02 PCT		Titrametric
10	CO2	Carbon Dioxide	120	0.02 PCT		
11	FeTot	Iron (Total)	120	0.01 PCT		
12	Mg	Magnesium	119	0.01 PCT		
13	Ms	Moisture	115	0.01 PCT		
14	S tot	Sulfur (Total)	120	0.02 PCT		
15	SO4	Sulfur (Sulfate)	120	0.05 PCT		
16	SIO2	Silica	114	0.01 PCT		

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REPORT: V88-00043.4 (COMPLETE)

REFERENCE INFO: REF. 023440-7-9166-3

CLIENT: ENERGY MINES AND RESOURCES CANADA
PROJECT: NONE GIVEN

SUBMITTED BY: C. W. SMITH
DATE PRINTED: 14-APR-88

SAMPLE TYPES	NUMBER	SIZE FRACTIONS	NUMBER	SAMPLE PREPARATIONS	NUMBER
P PREPARED PULP	120	4 AS REC'D	120	AS RECEIVED, NO SP	74

NOTES: = indicates SEE OBS REMARKS

REMARKS: THERE ARE SOME RESULTS MISSING AND DUE TO TIME CONSTRAINTS AND LACK OF SAMPLE MATERIAL, THEY COULDN'T BE RUN AGAIN.

REPORT COPIES TO: MR. T. FERGUSON

INVOICE TO: MR. T. FERGUSON

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REPORT: V88-11043.4 | PROJECT: NONE GIVEN | PAGE 1A

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Pb PPM	Zn PPM	Cd PPM	Co PPM	Ni PPM	Al PCT	As PPM	Ca PCT	CO2 PCT	Feiot PCT
P4 RTS-1 A		500	75	567	<1	10	5	4.08	13	2.53	<0.02	19.90
P4 RTS-1 A		490	71	555	<1	10	5	3.98	8	2.53	<0.02	19.90
P4 RTS-1 A		510	73	561	<1	10	5	4.00	4	2.53	<0.02	19.90
P4 RTS-1 A		515	72	558	<1	10	5	4.02	4	2.52	<0.02	19.80
P4 RTS-1 A		515	71	544	<1	10	5	4.08	3	2.50	<0.02	19.80
P4 RTS-1 B		500	74	562	<1	10	5	4.00	6	2.47	<0.02	19.80
P4 RTS-1 B		510	69	567	<1	10	5	4.00	4	2.50	<0.02	19.80
P4 RTS-1 B		490	76	542	<1	10	5	4.00	4	2.47	<0.02	19.90
P4 RTS-1 B		500	70	546	<1	10	5	4.00	4	2.50	<0.02	19.90
P4 RTS-1 B		505	71	543	<1	10	5	4.02	6	2.57	<0.02	19.90
P4 RTS-1 C		510	82	565	<1	10	5	4.10	7	2.83	<0.02	20.00
P4 RTS-1 C		500	74	573	<1	10	5	4.10	<2	2.72	<0.02	19.80
P4 RTS-1 C		475	75	530	<1	10	5	3.90	8	2.75	<0.02	19.90
P4 RTS-1 C		500	83	567	<1	10	5	4.08	6	2.83	<0.02	19.90
P4 RTS-1 C		520	84	578	<1	10	5	4.10	7	2.84	<0.02	19.90
P4 RTS-1 D		490	77	586	<1	10	5	3.92	6	2.68	<0.02	19.80
P4 RTS-1 D		510	81	594	<1	10	5	4.10	4	2.82	<0.02	19.80
P4 RTS-1 D		515	82	601	<1	10	5	4.20	8	2.82	<0.02	19.80
P4 RTS-1 D		500	75	560	<1	10	5	4.20	8	2.86	<0.02	19.80
P4 RTS-1 D		490	73	574	<1	10	5	4.10	3	2.75	<0.02	19.80
P4 RTS-1 F		500	78	582	<1	10	5	3.90	4	2.76	<0.02	19.80
P4 RTS-1 F		510	79	602	<1	10	5	4.00	8	2.82	<0.02	19.90
P4 RTS-1 F		500	78	584	<1	10	5	3.90	6	2.79	<0.02	19.80
P4 RTS-1 F		500	79	595	<1	10	5	3.90	3	2.73	<0.02	20.00
P4 RTS-1 F		505	86	593	<1	10	5	3.90	6	2.79	<0.02	19.80
P4 RTS-1 F		500	80	594	<1	10	5	3.90	7	2.79	<0.02	19.90
P4 RTS-1 F		530	83	588	<1	10	5	4.20	3	2.93	<0.02	19.80
P4 RTS-1 F		500	75	582	<1	10	5	4.10	6	2.90	<0.02	19.90
P4 RTS-1 F		535	80	556	<1	10	5	4.30	4	2.90	<0.02	19.90
P4 RTS-1 F		550	88	596	<1	10	5	4.55	4	3.04	<0.02	19.90
P4 RTS-2 A		570	22	113	<1	55	2200	0.70	6	0.50	<0.02	38.20
P4 RTS-2 A		560	22	124	<1	60	2200	0.78	8	0.57	<0.02	38.20
P4 RTS-2 A		570	23	119	<1	60	2200	0.80	7	0.50	<0.02	38.20
P4 RTS-2 A		550	21	127	<1	60	2200	0.80	4	0.57	<0.02	38.20
P4 RTS-2 A		590	18	125	<1	57	2300	0.80	6	0.60	<0.02	38.20
P4 RTS-2 B		600	22	125	<1	57	2250	0.80	4	0.57	<0.02	38.10
P4 RTS-2 B		560	21	125	<1	60	2250	0.80	4	0.54	<0.02	38.10
P4 RTS-2 B		550	20	123	<1	55	2200	0.79	6	0.57	<0.02	38.10
P4 RTS-2 B		610	20	130	<1	60	2300	0.81	6	0.64	<0.02	38.10
P4 RTS-2 B		560	20	115	<1	55	2150	0.71	7	0.58	<0.02	38.20

Registered Assayer, Province of British Columbia

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Certificate of Analysis

REPORT: V88-00043.4

PROJECT: NONE GIVEN

SAMPLE NUMBER	ELEMENT UNITS	Mg PCT	Mn PCT	S tot PCT	SO4 PCT	SiO2 PCT
P4 RTS-1 A		2.67	1.72	1.62	1.16	41.87
P4 RTS-1 A		2.67	1.88	1.62	1.22	41.88
P4 RTS-1 A		2.67	1.73	1.62	1.18	42.16
P4 RTS-1 A		2.67	1.51	1.63	1.15	42.19
P4 RTS-1 A		2.67	1.56	1.63	1.10	42.15
P4 RTS-1 B		2.70	1.99	1.63	1.17	41.98
P4 RTS-1 B		2.70	1.90	1.63	1.12	42.18
P4 RTS-1 B		2.67	1.76	1.63	1.19	42.38
P4 RTS-1 B		2.67	1.85	1.64	1.18	42.69
P4 RTS-1 B		2.65	1.64	1.64	1.15	42.46
P4 RTS-1 C		2.65	1.72	1.63	1.15	42.35
P4 RTS-1 C		2.60	1.74	1.63	1.17	42.51
P4 RTS-1 C		2.67	1.67	1.63	1.19	42.11
P4 RTS-1 C		2.70	1.61	1.64	1.18	42.28
P4 RTS-1 C		2.73	1.53	1.64	1.17	42.12
P4 RTS-1 D		2.67	1.84	1.64	1.23	42.07
P4 RTS-1 D		2.67	2.00	1.64	1.20	41.38
P4 RTS-1 D		2.70	1.64	1.64	1.20	41.40
P4 RTS-1 D		2.67	1.71	1.63	1.23	41.38
P4 RTS-1 D		2.60	1.54	1.63	1.24	41.04
P4 RTS-1 F		2.67		1.63	1.23	41.42
P4 RTS-1 F		2.67	1.18	1.63	1.22	41.42
P4 RTS-1 F		2.66	1.31	1.62	1.22	42.10
P4 RTS-1 F		2.66	1.32	1.63	1.23	39.69
P4 RTS-1 F		2.60	1.31	1.63	1.22	40.45
P4 RTS-1 F		2.63	1.74	1.62	1.20	41.77
P4 RTS-1 F		2.67	1.88	1.64	1.20	41.61
P4 RTS-1 F		2.67	1.70	1.64	1.22	41.20
P4 RTS-1 F		2.67	1.69	1.64	1.21	41.81
P4 RTS-1 F		2.73	1.41	1.63	1.20	41.97
P4 RTS-2 A		0.36		18.25	3.70	5.12
P4 RTS-2 A		0.36	1.93	18.30	3.67	5.80
P4 RTS-2 A		0.36	2.26	18.37	3.68	6.00
P4 RTS-2 A		0.36	2.13	18.48	3.70	5.96
P4 RTS-2 A		0.36	1.80	18.51	3.72	5.79
P4 RTS-2 B		0.36	1.48	18.33	3.70	5.44
P4 RTS-2 B		0.36	1.62	18.44	3.69	6.06
P4 RTS-2 B		0.36	2.00	18.38	3.69	5.99
P4 RTS-2 B		0.36	1.77	18.47	3.70	6.08
P4 RTS-2 B		0.34	1.88	18.46	3.69	5.58

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Certificate of Analysis

REPORT: V88-01043.4 | PROJECT: NONE GIVEN | PAGE 2A

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Pb PPM	Zn PPM	Cd PPM	Co PPM	Ni PPM	Al PCT	As PPM	Ca PCT	CO2 PCT	FeTot PCT
P4 RTS-2 C		550	23	119	<1	60	2150	0.80	4	0.57	<0.02	38.10
P4 RTS-2 C		560	22		<1	55	2200		6		<0.02	38.10
P4 RTS-2 C		560	23	125	<1	53		0.70	7	0.54	<0.02	38.10
P4 RTS-2 C		550	24	117	<1	57	2100	0.71	6	0.57	<0.02	38.20
P4 RTS-2 C		570	20	126	<1	48	2200	0.80	7	0.62	<0.02	38.20
P4 RTS-2 D		555	23	121	<1	60	2200	0.80	6	0.57	<0.02	38.20
P4 RTS-2 D		610	21	131	<1	60	2300	0.80	4	0.60	<0.02	38.20
P4 RTS-2 D		590	21	128	<1	60	2250	0.80	4	0.57	<0.02	38.10
P4 RTS-2 D		540	24	115	<1	55	2150	0.72	6	0.57	<0.02	38.20
P4 RTS-2 D		565	21	122	<1	60	2250	0.80	6	0.60	<0.02	38.10
P4 RTS-2 E		540	23	123	<1	50	2170	0.70	8	0.54	<0.02	38.20
P4 RTS-2 E		570	21	128	<1	60	2270	0.80	7	0.61	<0.02	38.30
P4 RTS-2 E		565	18	123	<1	60	2220	0.80	6	0.57	<0.02	38.20
P4 RTS-2 E		580	20	121	<1	60	2300	0.82	8	0.59	<0.02	38.20
P4 RTS-2 E		580	21	121	<1	60	2250	0.90	4	0.60	<0.02	38.10
P4 RTS-2 F		570	20	118	<1	60	2250	0.75	4	0.60	<0.02	38.30
P4 RTS-2 F		550	20	114	<1	57	2250	0.72	3	0.60	<0.02	38.20
P4 RTS-2 F		570	19	121	<1	57	2250	0.75	4	0.57	<0.02	38.20
P4 RTS-2 F		570	21	116	<1	60	2250	0.75	4	0.57	<0.02	38.20
P4 RTS-2 F		610	19	125	<1	60	2330	0.98	6	0.60	<0.02	38.20
P4 RTS-3 A		2600	111	1891	7	230	55	4.40	9	1.99	<0.02	21.20
P4 RTS-3 A		2500	105	1880	7	215	55	4.18	8	1.80	<0.02	21.20
P4 RTS-3 A		2500	112	1880	7	223	55	4.20	8	1.84	<0.02	21.20
P4 RTS-3 A		2500	112	1874	7	220	55	4.15	13	1.84	<0.02	21.20
P4 RTS-3 A		2600	109	1971	7	230	55	4.40	9	1.91	<0.02	21.10
P4 RTS-3 B		2500	106	1900	7	220	55	4.29	9	1.84	<0.02	21.20
P4 RTS-3 B		2600	116	1950	7	225	55	4.45	8	1.91	<0.02	21.20
P4 RTS-3 B		2500	113	1886	7	220	55	4.20	8	1.84	<0.02	21.30
P4 RTS-3 B		2500	114	1953	7	220	55	4.20	8	1.89	<0.02	21.20
P4 RTS-3 B		2550	114	1982	7	225	55	4.48	6	1.91	<0.02	21.20
P4 RTS-3 C		2600	120	1863	7	225	60	4.29	7	1.91	<0.02	21.20
P4 RTS-3 C		2500	110	1890	7	220	55	4.00	4	1.78	<0.02	21.20
P4 RTS-3 C		2500	114	1882	7	215	55	3.90	3	1.84	<0.02	21.20
P4 RTS-3 C		2550	112	1941	7	215	55	3.95	8	1.91	<0.02	21.20
P4 RTS-3 C		2550	110	1919	7	220	55	4.10	9	1.84	<0.02	21.30
P4 RTS-3 D		2500	110	1891	7	220	55	3.98	9	1.79	<0.02	21.20
P4 RTS-3 D		2450	109	1821	7	216	55	3.90	12	1.72	<0.02	21.20
P4 RTS-3 D		2550	114	1900	7	225	55	4.20	13	1.84	<0.02	21.20
P4 RTS-3 D		2500	120	1902	7	225	57	4.00	6	1.89	<0.02	21.20
P4 RTS-3 D		2650	113	1998	7	230	60	4.00	9	1.91	<0.02	21.20

Registered Assayer, Province of British Columbia

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ECO-TECH LABORATORIES

Certificate of Analysis

REPORT: V88-00043.4 PROJECT: NONE GIVEN PAGE 2B

SAMPLE NUMBER	ELEMENT UNITS	Mg PCT	Ms PCT	S tot PCT	SO4 PCT	SiO2 PCT
P4 RTS-2 C		0.34	2.46	18.41	3.65	5.92
P4 RTS-2 C		=	2.00	18.44	3.60	5.88
P4 RTS-2 C		0.34	2.54	18.28	3.63	5.78
P4 RTS-2 C		0.36	2.52	18.41	3.70	5.67
P4 RTS-2 C		0.35	2.00	18.48	3.64	5.87
P4 RTS-2 D		0.36	2.42	18.31	3.61	5.59
P4 RTS-2 D		0.34	1.98	18.38	3.64	4.17
P4 RTS-2 D		0.40	2.32	18.46	3.61	5.72
P4 RTS-2 D		0.34	2.30	18.32	3.62	5.87
P4 RTS-2 D		0.35	1.96	18.39	3.57	5.84
P4 RTS-2 E		0.36	1.63	18.40	3.63	5.84
P4 RTS-2 E		0.36	1.76	18.52	3.59	5.93
P4 RTS-2 E		0.36	2.04	18.37	3.57	5.68
P4 RTS-2 E		0.36	2.18	18.44	3.57	5.80
P4 RTS-2 E		0.36	1.96	18.42	3.59	5.92
P4 RTS-2 F		0.36	1.88	18.48	3.56	5.45
P4 RTS-2 F		0.35	2.38	18.43	3.60	4.56
P4 RTS-2 F		0.35	1.87	18.37	3.58	5.45
P4 RTS-2 F		0.35	2.36	18.30	3.62	5.57
P4 RTS-2 F		0.36	2.00	18.44	3.54	5.91
P4 RTS-3 A		2.48	1.98	10.10	1.59	32.80
P4 RTS-3 A		2.40	2.32	10.08	1.61	32.46
P4 RTS-3 A		2.47	2.42	10.04	1.62	32.41
P4 RTS-3 A		2.47	2.34	10.14	1.58	31.84
P4 RTS-3 A		2.55	2.18	10.08	1.59	32.12
P4 RTS-3 B		2.45	2.24	10.08	1.61	32.89
P4 RTS-3 B		2.38	2.08	10.02	1.62	32.10
P4 RTS-3 B		2.55	2.42	9.92	1.59	31.96
P4 RTS-3 B		2.40	2.44	10.17	1.60	31.66
P4 RTS-3 B		2.38	2.02	10.12	1.61	32.28
P4 RTS-3 C		2.55	1.99	9.95	1.58	32.76
P4 RTS-3 C		2.40	1.91	10.00	1.60	32.98
P4 RTS-3 C		2.40	1.98	10.08	1.60	32.89
P4 RTS-3 C		2.48	2.06	10.04	1.56	32.23
P4 RTS-3 C		2.46	1.80	10.04	1.57	32.38
P4 RTS-3 D		2.40	1.82	10.29	1.62	31.44
P4 RTS-3 D		2.45	1.86	10.33	1.58	32.90
P4 RTS-3 D		2.48	1.96	10.21	1.60	31.85
P4 RTS-3 D		2.48	1.84	10.25	1.58	32.37
P4 RTS-3 D		2.53	1.85	10.31	1.58	32.03

Registered Assayer, Province of British Columbia

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SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Pb PPM	Zn PPM	Cd PPM	Co PPM	Ni PPM	Al PCT	As PPM	Ca PCT	CO2 PCT	FeTot PCT
P4 RTS-3 E		2600	120	2077	7	230	55	4.30	8	1.91	<0.02	21.20
P4 RTS-3 E		2750	124	1967	7	235	60	4.70	8	1.98	<0.02	21.20
P4 RTS-3 E		2700	119	2047	7	237	60	4.70	12	1.91	<0.02	21.20
P4 RTS-3 E		2650	122	2026	7	235	56	4.60	11	1.84	<0.02	21.20
P4 RTS-3 E		2700	118	2052	7	235	56	4.60	9	1.91	<0.02	21.30
P4 RTS-3 F		2650	110	1995	7	230	60	4.35	9	1.84	0.02	21.20
P4 RTS-3 F		2650	118	2038	7	230	60	4.42	9	1.91	<0.02	21.20
P4 RTS-3 F		2700	122	2033	7	235	58	4.60	9	1.91	0.02	21.20
P4 RTS-3 F		2630	109	2013	8	232	65	4.40	9	1.92	<0.02	21.20
P4 RTS-3 F		2650	115	1945	7	232	60	4.50	9	1.91	0.04	21.30
P4 RTS-4 A		2350	29	155	<1	150	6800	0.30	190	0.36	0.08	56.90
P4 RTS-4 A		2400	29	154	<1	156	7000	0.30	200	0.40	0.12	57.00
P4 RTS-4 A		2400	29	154	<1	160	7100	0.30	190	0.42	0.14	56.70
P4 RTS-4 A		2500	32	153	<1	158	7200	0.30	110	0.43	0.12	56.90
P4 RTS-4 A		2450	28	161	<1	155	7000	0.30	190	0.39	0.17	57.10
P4 RTS-4 B		2300	30	143	<1	150	6800	0.30	180	0.39	0.09	57.10
P4 RTS-4 B		2500	31	158	<1	150	6850	0.30	180	0.36	0.07	56.90
P4 RTS-4 B		2400	30	146	<1	150	7150	0.30	180	0.35	0.05	57.10
P4 RTS-4 B		2550	31	156	<1	155	6950	0.30	90	0.36	0.09	56.90
P4 RTS-4 B		2400	28	150	<1	155	7200	0.35	120	0.36	0.09	57.00
P4 RTS-4 C		2300	29	154	<1	160	7000	0.30	190	0.42	0.09	57.00
P4 RTS-4 C		2300	31	154	<1	155	7180	0.30	180	0.41	0.12	57.10
P4 RTS-4 C		2400	27	166	<1	160	7150	0.30	190	0.43	0.12	56.90
P4 RTS-4 C		2400	31	163	<1	160	7150	0.30	130	0.42	0.14	56.90
P4 RTS-4 C		2400	30	159	<1	155	6900	0.30	190	0.36	0.16	56.90
P4 RTS-4 D		2300	30	155	<1	153	6800	0.30	190	0.38	0.28	56.90
P4 RTS-4 D		2400	27	166	<1	160	7200	0.30	190	0.37	0.09	56.90
P4 RTS-4 D		2300	28	152	<1	155	6850	0.30	90	0.37	0.15	57.00
P4 RTS-4 D		2400	30	159	<1	157	7150	0.32	110	0.43	0.21	56.90
P4 RTS-4 D		2400	27	163	<1	157	7100	0.30	120	0.39	0.02	57.00
P4 RTS-4 F		2400	29	159	<1	157	7000	0.32	190	0.36	0.09	57.10
P4 RTS-4 F		2400	31	153	<1	160	7100	0.32	190	0.38	0.02	56.90
P4 RTS-4 F		2400	32	160	<1	160	7100	0.38	190	0.41	0.10	57.10
P4 RTS-4 F		2400	28	159	<1	160	7200	0.32	180	0.43	0.14	57.10
P4 RTS-4 F		2300	80	156	<1	155	6700	0.25	190	0.39	0.14	57.00
P4 RTS-4 F		2400	44	162	<1	165	7150	0.30	180	0.37	0.07	57.00
P4 RTS-4 F		2400	31	161	<1	160	7050	0.30	200	0.37	0.03	56.80
P4 RTS-4 F		2300	28	150	<1	155	6900	0.30	190	0.36	0.03	57.00
P4 RTS-4 F		2400	29	161	<1	165	7200	0.32	200	0.43	0.05	56.90
P4 RTS-4 F		2400	29	158	<1	162	7100	0.30	190	0.42	0.09	56.80

RKR

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PROJECT: NONE GIVEN

SAMPLE NUMBER	ELEMENT UNITS	Mg PCT	Mn PCT	S tot PCT	SO4 PCT	SiO2 PCT
P4 RTS-3 E		2.45	2.29	10.08	1.58	32.47
P4 RTS-3 E		2.48	2.17	10.00	1.60	31.84
P4 RTS-3 E		2.53	2.34	10.04	1.59	32.27
P4 RTS-3 E		2.53	2.28	9.95	1.56	31.88
P4 RTS-3 E		2.48	1.96	10.19	1.60	32.02
P4 RTS-3 F		2.48	2.10	10.06	1.58	32.36
P4 RTS-3 F		2.50	2.46	10.33	1.56	32.31
P4 RTS-3 F		2.53	2.66	10.42	1.59	32.48
P4 RTS-3 F		2.50	2.50	10.08	1.58	32.14
P4 RTS-3 F		2.53	2.16	10.23	1.59	32.44
P4 RTS-4 A		0.19	0.28	36.05	0.26	1.99
P4 RTS-4 A		0.18	0.36	36.60	0.27	
P4 RTS-4 A		0.19	0.34	36.25	0.27	
P4 RTS-4 A		0.20	0.46	36.25	0.27	
P4 RTS-4 A		0.18	0.30	36.43	0.26	
P4 RTS-4 B		0.19	0.30	36.28	0.25	1.91
P4 RTS-4 B		0.19	0.27	36.20	0.29	1.90
P4 RTS-4 B		0.20	0.31	36.31	0.30	1.92
P4 RTS-4 B		0.20	0.33	36.80	0.29	1.98
P4 RTS-4 B		0.19	0.29	36.80	0.30	1.89
P4 RTS-4 C		0.20	0.30	36.21	0.30	1.98
P4 RTS-4 C		0.20	0.38	36.42	0.29	2.01
P4 RTS-4 C		0.19	0.39	36.25	0.26	2.08
P4 RTS-4 C		0.20	0.30	36.20	0.27	1.99
P4 RTS-4 C		0.20	0.33	36.38	0.29	2.06
P4 RTS-4 D		0.20	0.31	36.46	0.27	2.08
P4 RTS-4 D		0.18	0.31	36.58	0.32	2.03
P4 RTS-4 D		0.18	0.42	36.59	0.30	2.08
P4 RTS-4 D		0.20	0.54	36.51	0.26	2.02
P4 RTS-4 D		0.20	0.24	36.69	0.28	
P4 RTS-4 F		0.17	0.25	36.48	0.27	1.95
P4 RTS-4 F		0.17	0.29	36.09	0.31	1.97
P4 RTS-4 F		0.17	0.30	35.98	0.31	2.08
P4 RTS-4 F		0.20	0.31	35.94	0.26	1.97
P4 RTS-4 F		0.18	0.22	35.74	0.28	2.00
P4 RTS-4 F		0.19	0.17	36.12	0.27	2.04
P4 RTS-4 F		0.17	0.13	36.30	0.26	1.98
P4 RTS-4 F		0.17		36.16	0.25	2.05
P4 RTS-4 F		0.19		36.20	0.26	1.94
P4 RTS-4 F		0.19		36.09	0.26	

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